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Abstract

Results are presented frcm a study of classrcom and class laboratory space utilization at the University of Washingtcn. The report is limited to space used for direct instruction in regularly scheduled classes in all disciplines except medicine, dentistry, and nursing; classes given during the day and evening are included. It does not include classes given in offices or lccations other than classrocms or class laboratories, nor the many unscheduled hours cf use cf thcse rccms. Utilization is measured by--(1) the average number of hours per week per room, and (2) the percent cf staticns cccupied when the rocm is in use. Alsc included is a descriptiocn cf the facilities inventory system utilized, which conforms to a federally estaLlished system cf inventory with scme additicnal provisions to satisfy requirements of state agencies. (FS)

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SPACE UTILIZATION

UNIVERSITY OF WASHINGTON

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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FACILITIES PLANNING AND CONSTRUCTION

JUNE, 1968

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UNIVERSITY OF WASHINGTON
Facilities Planning and Construction

June, 1968

CLASSROOM UTILIZATION STUDIES -- Report No. 5

SUBJECT: Classroom and Class Laboratory Utilization

I. Summary of Findings:

1. While the total number of seats in classrooms and laboratories is increasing, it is not doing so at the same rate as the enrollment. There are getting to be fewer chairs for more and more students.

2. Classroom use averages 30.3 hours a week at 57% fullness. Class laboratory use averages 21.5 hours a week at 71% fullness. In both cases, hours of use exceed the targets (30 and 20 hours) and the fullness is nearing them (60 and 80%).

3. The amount of classroom and laboratory space per student has declined from 17.7 to 15.7 square feet in the last two years.

4. In the last five years, new students have been accommodated by making increasingly intensive use of classrooms. The combination of hours and fullness (called average station use per week) has grown from 13.5 to 17.3 hours in classrooms and from 9.6 to 15.3 in laboratories in that time.

5. The smallest and largest classrooms are most fully utilized. The smallest and medium sized class labs are most used.

6. Of the total rooms available, the number in use every hour shows only a little leeway for addition of new classes. For 6 hours of every day, between 70 and 80% of all rooms are in use for regularly scheduled classes.

7. Small classes of less than 30 students accounted for 71% of the total offered last fall. Yet only 15% of the classrooms are in this size category. There are 6 class labs over 50 in capacity, although there are no lab classes of that size.

8. The intensity of the use of space is shown in one number by the number of square feet available per 100 hours of use. The low value of 78.4 square feet indicates extremely high classroom scheduling and utilization.

9. Without the addition of new classrooms, facilities would be inadequate for Autumn Quarter of 1968. Addition of the new rooms only keeps up with the enrollment increase and space again will be in short supply the next fall. The conversion of classrooms to other uses should be prohibited.

10. A recent enrollment projection predicts 34,000 students by 1970. Average utilization predicts the need for 49 new classrooms to take care of this enrollment. In the coming academic year 24 new rooms will be provided. It is unlikely that the additional necessary rooms will be made available by 1970, and more intensive use of existing facilities will be necessary.

II. Introduction:

In the decade between 1957 and 1967 the daytime enrollment at the University of Washington rose 85%. This increase (from 15,427 to 28,526) has resulted from the larger number of persons of college age, the increasing numbers attending college, and the greater number going on to graduate school. For the University, even this phenomenal 85% increase does not tell the entire story. The figures do not include the 1,451 students who attended class after 5:30 p.m. and additional students enrolled in non-credit courses.

To prepare for these additional students, the University has for some years studied the use of its facilities and has looked for methods of increasing use. Rapidly growing enrollment, coupled with the fact that adding to the physical plant is expensive and takes time, emphasizes that the most efficient use possible must be made of all space.

This is the fifth report in the series, which began in 1963. It is limited to space used for direct instruction in regularly scheduled classes. It does not include classes given in offices or locations other than classrooms or class laboratories, nor the many unscheduled hours of use of those rooms. Further, a study of only classroom and laboratory utilization does not provide a complete picture of the University's use of its resources. In view of the critical problems faced because of the sheer numbers of students, however, these elements are given serious consideration.

Utilization is measured by: (1) the average number of hours per week per room and (2) the per cent of stations occupied when the room is in use. The terms of measurement are: 30 hours a week with an average of 60% of capacity for classrooms and 20 hours with 80% fullness for class labs.

This report includes all disciplines except medicine, dentistry and nursing. Classes given during the day and evening are included.

III. Instructional Space Available:

The total number of rooms and student stations used for instruction fluctuates from year to year as rooms are remodeled and others are added to or taken from the classroom pool. In Autumn Quarter, 1967 there were 19,596 stations in 351 classrooms and 4,316 in 148 laboratories available. Health science facilities are included in this count.

The ratio of student stations to the number of students since 1965 is shown in Figure 1. While the total supply of student places is increasing, the graph shows there is a steady decline in the ratio. This means that growth in the number of classroom chairs is not keeping pace with the surge in enrollment. This trend should be stopped and reversed.

A customary way of looking at available teaching space is to measure the number of square feet per person. The table on the next page points out the decrease in the amount of space per student over the last few years.

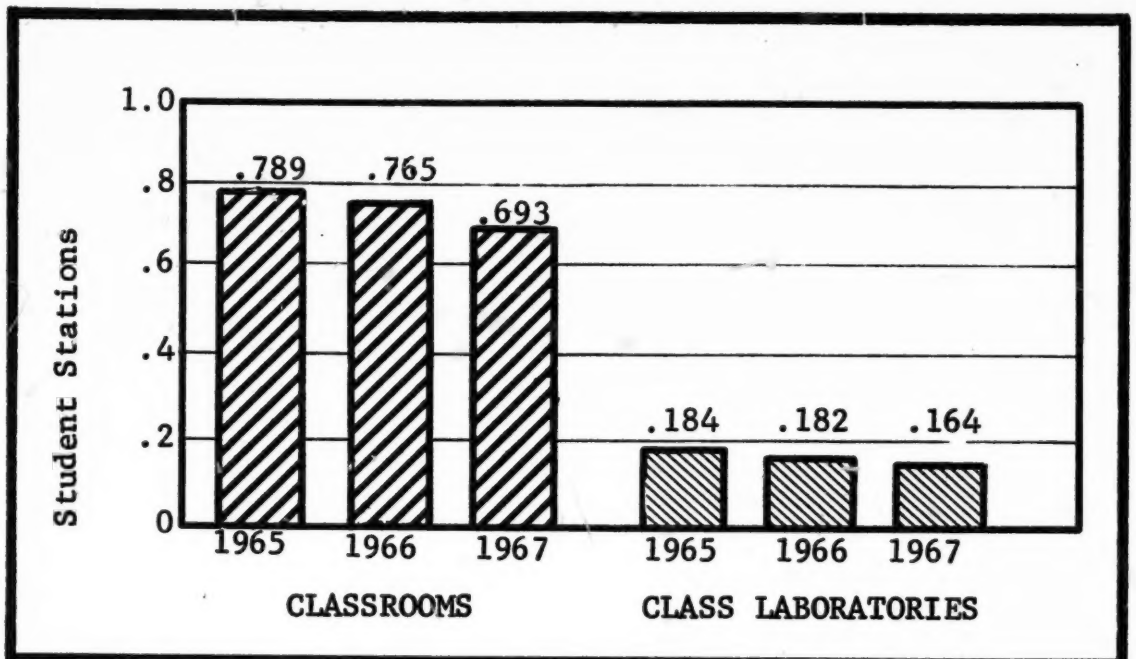

Figure 1. Station-to-Student Ratio

ASSIGNABLE SQUARE FEET PER STUDENT

Year	Classrooms	Class Laboratories	Total
1965	10.67	6.99	17.66
1966	10.35	7.12	17.47
1967	9.32	6.37	15.69

IV. Increase in Instruction:

The number of hours of class instruction in a week has been increasing steadily over the past years. Additional students generate not only larger classes, but also (where class size is limited) more classes to be taught.

The implications of this increase shown in Figure 2 on the next page are twofold: (1) if additional classes are to be taught, space to do so must be continually added to the general classroom pool; and (2) if it is not possible to provide additional teaching space, continuing study must be given to teaching methods.

Over the past few years the additional students enrolled have been accommodated primarily by making more intensive use of already existing facilities. Classroom utilization, however, has now surpassed the goals set, and this means of providing additional classroom seats must necessarily decrease in importance. Renewed efforts must be made to provide a growth in classroom space that keeps pace with the rising enrollment.

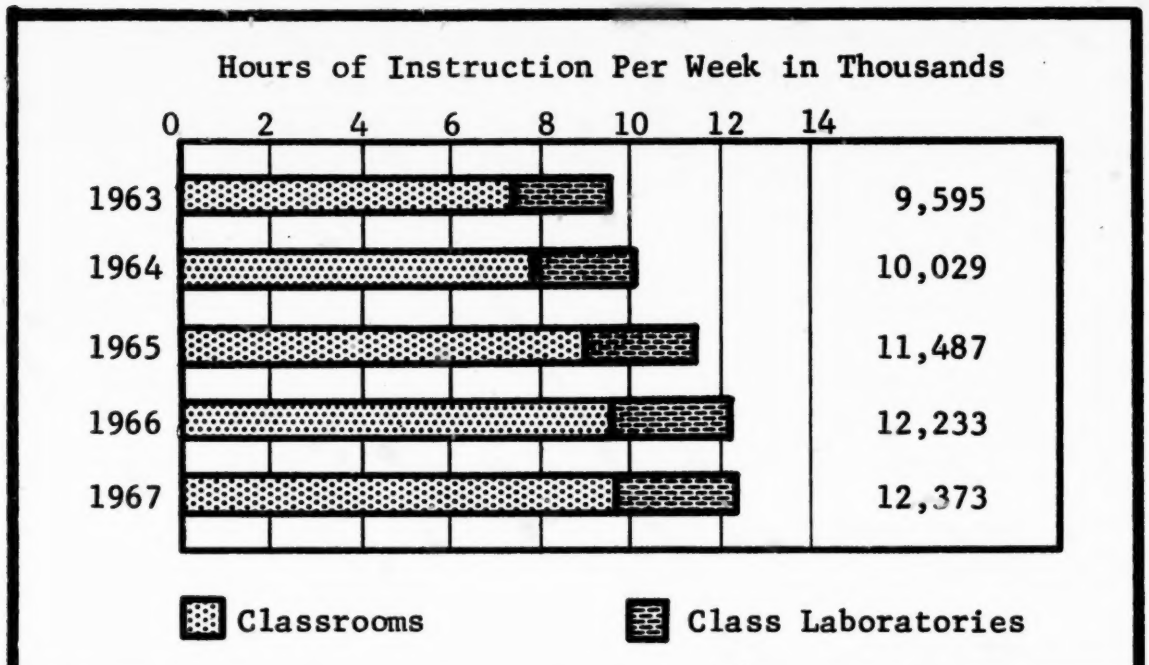

Figure 2. Increase in Instruction by Room Type

V. Utilization of Classrooms:

In the new federal-state space classification system in effect at the University, seminar rooms are combined with classrooms; therefore, all subsequent remarks refer to the combination. Statistics for the two have been combined for previous years so that the data is comparable.

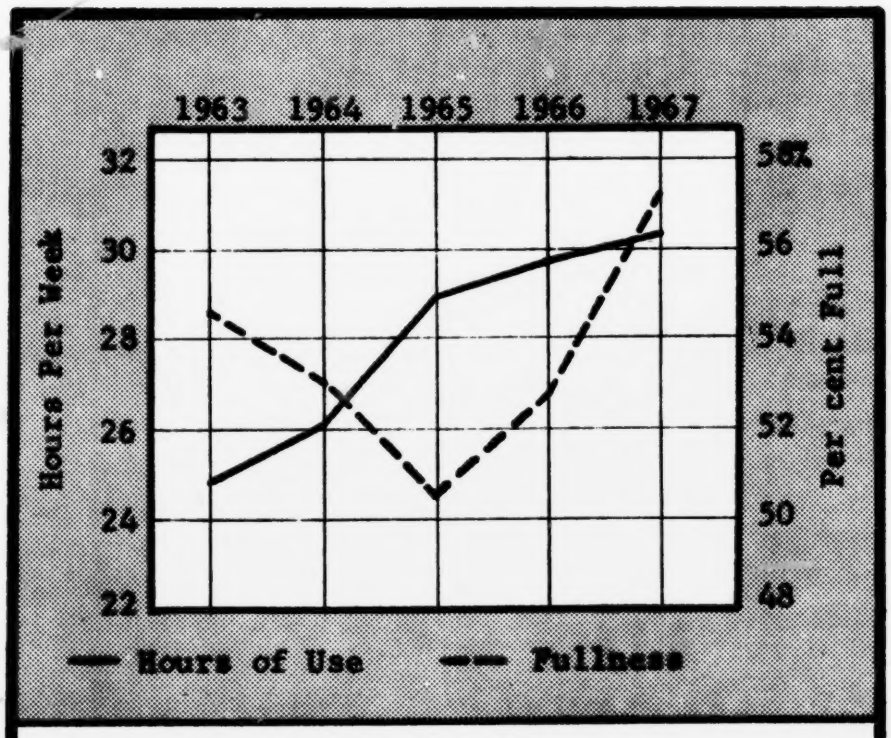

Figure 3. Classroom Utilization

There were 319 rooms used mainly for scheduled classes in the fall of 1967. This represents a net addition of only 17 rooms to the classroom pool in the five years since these studies began, but a decrease of 3 since the last year. Yet, in the years since 1963 the daytime enrollment has grown by 36%, from 20,962 to 28,526. To provide classroom seats for these students, more and more intensive use has been made of existing rooms. This frequently has been accomplished by (1) scheduling larger sections, which in some cases meant over-crowding classes, or (2) the addition of new sections at off-hours or days.

The last five years show a steady rise in the average number of hours a week each classroom is in use, Figure 3. The average for all the rooms now exceeds the goals for utilization. The result has been a loss of flexibility in scheduling classes and arranging special meetings and examinations. The completion of the new Engineering Classroom-Library Building will again provide space for new students as well as regain some necessary flexibility.

The more intensive use of existing classrooms also is shown in the measurement of the student stations occupied when the room is in use, on Figure 3. After an initial decline, the fullness has risen near the goal set for classrooms. By a more judicious match of class size to room size it may still be possible to serve more students, but this method of increasing use is becoming more and more difficult.

It has been historically true that the buildings in the center of campus are well utilized, while those on the periphery are not. Although this is still true to a certain degree, the use of more remote facilities has increased markedly over the past years. Typical of high usage areas is Denny Hall, where 23 classrooms are each used an average of 39 hours a week; Guthrie Hall, where 10 rooms are each used 36.8 hours; Miller Hall, where 11 rooms are each used 35 hours; Physics Hall, where 15 are each used 35.8 hours; and Thomson Hall, where 16 rooms are each used 36.9 hours a week. Some extremely low usage areas are the Fisheries Center, where 4 rooms are used 11.3 hours each and Oceanography Barge, where 1 classroom is used 12 hours a week.

VI. Utilization of Class Laboratories:

Last fall 126 laboratories were classified as used mainly for scheduled classes. This number represents an addition of one since last year, but a net decrease of 5 since 1963. Because laboratories are special-use rooms and are not interchangeable, it is more difficult to increase their use. Yet, over the past five years the average hours of use has steadily risen with the enrollment, from 16.1 to 21.5 hours per laboratory. The fullness had been declining until this year, when it made a steep rise. This was because of the higher enrollment in part, but primarily because of a re-survey and classification based on a room-by-

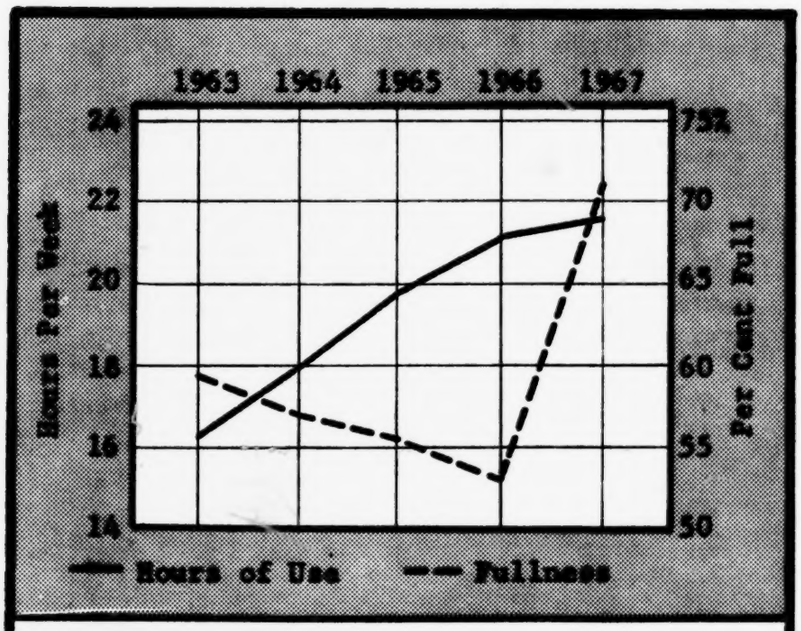

Figure 4. Class Laboratory Utilization

room check of laboratories that resulted in more accurate data.

Some of the most intensively utilized class laboratories are 19 rooms in the Art Building used an average of 35.5 hours each, 5 rooms in the Drama-TV Building used 26.7 hours each, and 2 labs on the Oceanography Barge used 30.5 hours each.

VII. Average Station Use Per Week:

A third measurement of utilization is the combination of room use and fullness into the average hours each station is used in a week. As indicated in Figure 5, the combination results in 18 hours use each for classroom seats and 16 hours each for lab stations as the average utilization.

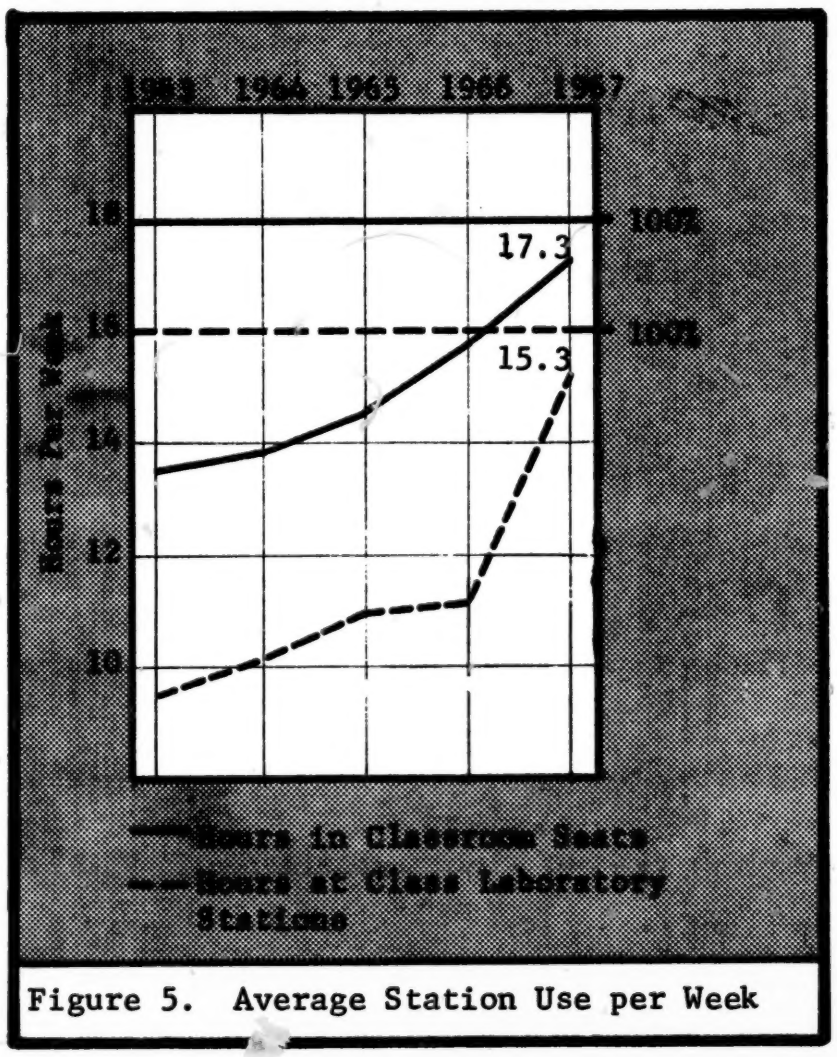

Figure 5. Average Station Use per Week

Based on the statistics of room use and station occupancy in Figures 3 and 4, changes over the past five years have been calculated. The graph shows use is closely approaching the averages recommended. Again it is evident that new students have been accommodated primarily by increasing use of existing facilities, with few additions of instructional rooms. Only small margins for increased utilization remain. Plans must be made for future emphasis on adding new labs and classrooms to the pool.

VIII. Room Use by Day of the Week:

If the number of classes offered increases and the supply of rooms remains relatively constant, it follows that the less crowded hours and days must be more intensively scheduled. Since these studies began there has been a consistent trend to establishing a more even load for all days of the week. For instance, where the number of classes on Monday was 4% larger than on Tuesday in 1963, this difference was only .6% last fall.

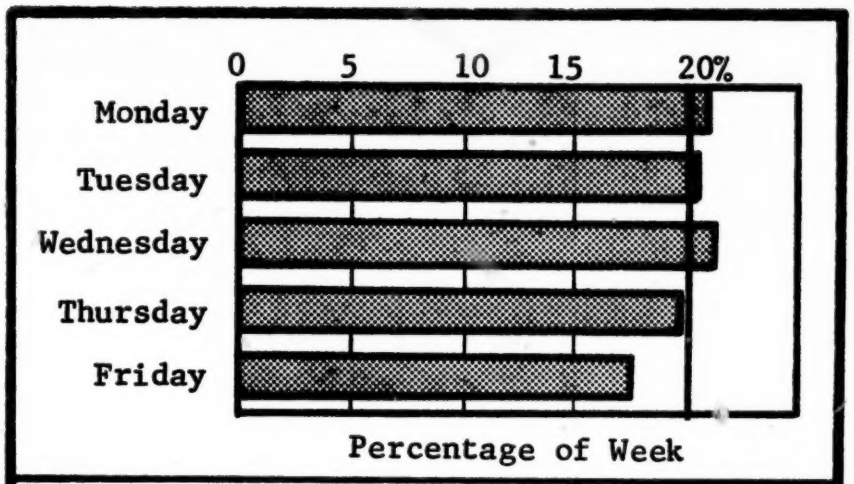

Figure 6. Room Use by Day of the Week

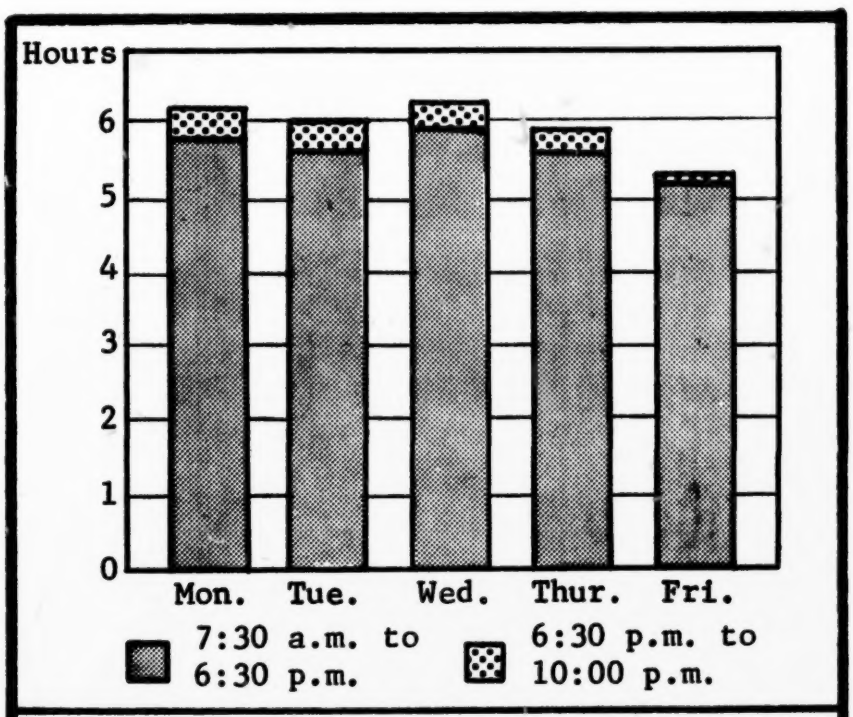

Figure 7. Average Hours Per Room Per Day

The figures to the left include all classes given up to 10:00 p.m. Lower use of Friday is due, in part, to the practice of scheduling night classes on a Monday-Wednesday or a Tuesday-Thursday basis.

Figure 6 indicates the possibilities for scheduling new classes on under-utilized days are rapidly diminishing. New classrooms must be provided.

Another significant measure of room use is the number of hours each room is used per day. Figure 7 gives this information for two time periods: from 7:30 a.m. to 6:30 p.m. and from 6:30 p.m. to 10:00 p.m.

This use has been rising continually over recent years. As of Autumn Quarter, 1967 each of the 445 classrooms and labs is in use by a scheduled class nearly six hours every day.

Such intensive use of teaching space has many ramifications. For example, it often is difficult to schedule special events and meetings, to arrange make-up time for students, to set aside time for maintenance projects, or to plan for adequate janitorial services.

In Figure 7 the data for classrooms and class laboratories is combined. Showing these items separately, Figure 8 challenges two prevalent beliefs about class scheduling. These beliefs are: (1) classrooms are used on Monday, Wednesday, and Friday while labs are used on Tuesday and Thursday, and (2) some days are used much more than others. In fact, room usage is spread very evenly throughout the week in both kinds of facilities.

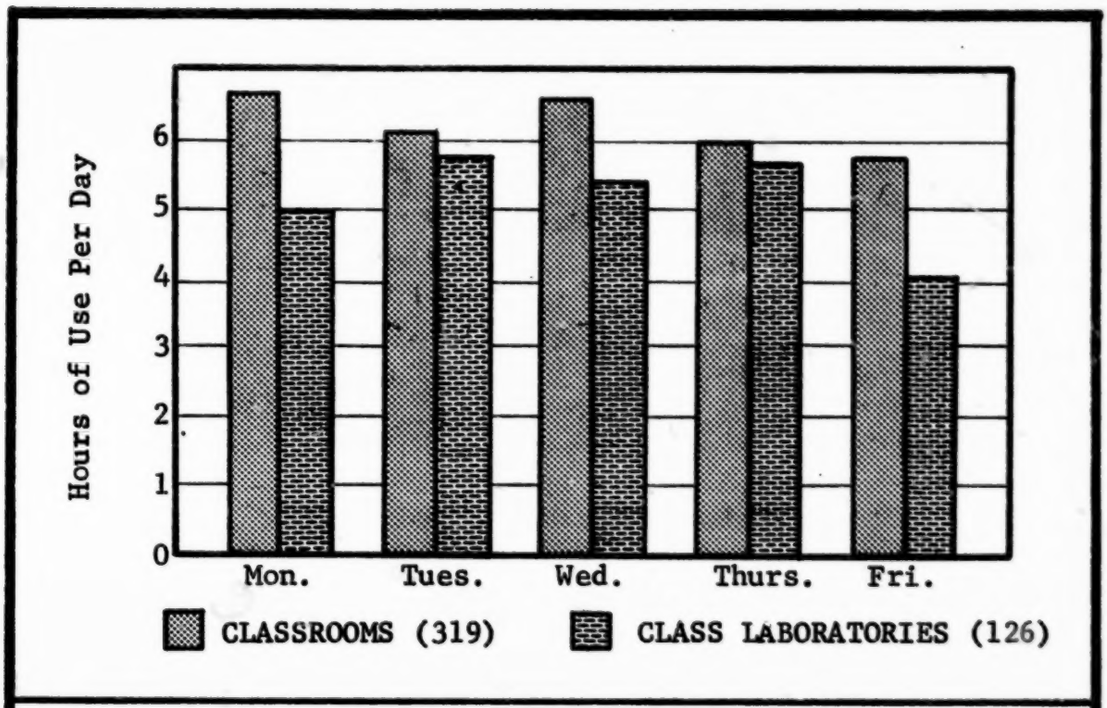

Figure 8. Average Hours of Use Per Room Per Day

The average class size does not change significantly by day of the week. The table below shows the averages in each kind of teaching space as well as in both types combined. Notice that last Autumn Quarter the average size was 31.8 students in classrooms and 16.3 students in class laboratories.

When new classrooms and laboratories are built, careful consideration should be given to current average class size as well as to academic plans for changes in teaching methods that may affect it.

AVERAGE CLASS SIZE BY ROOM TYPE AND WEEK DAY

	Classrooms	Class Laboratories	All Rooms
Monday	33.3	16.0	29.2
Tuesday	30.2	16.5	26.4
Wednesday	32.2	16.3	28.2
Thursday	30.0	16.0	26.2
Friday	33.1	16.9	29.6
AVERAGE	31.8	16.3	27.9

IX. Room Use by Time of Day:

When all rooms are considered together it is seen that the balance between morning and afternoon classes has remained essentially the same for the past few years. In Autumn Quarter of 1967, 53.6% of all classes

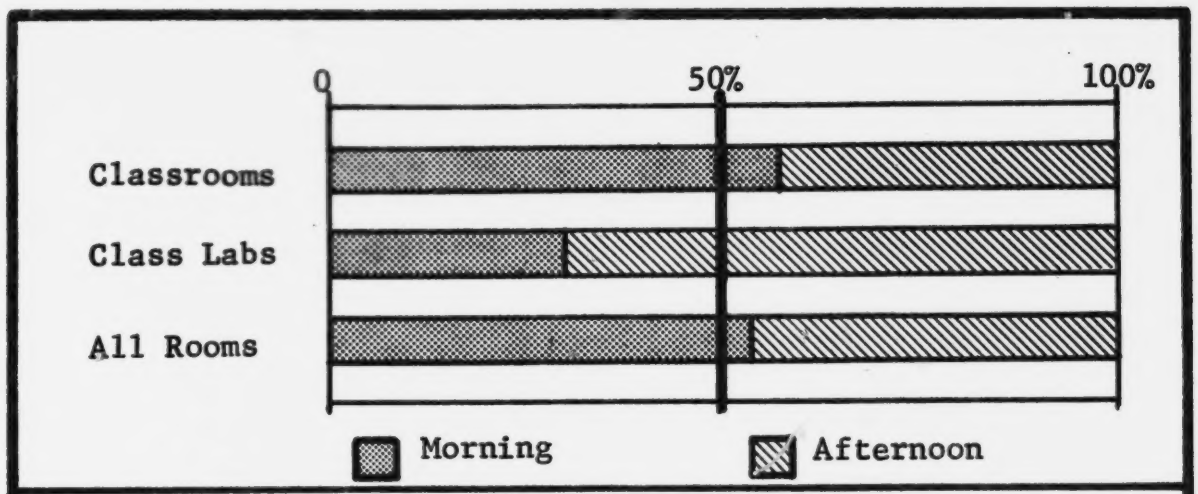

Figure 9. Morning-Afternoon Classes

were in the morning compared to 46.3% in the afternoon. However, when classes are separated by type, as they are in Figure 9, the disparity for class laboratories is quite large. While the difference between morning and afternoon classes has been reduced from last year for classrooms, it has risen for class laboratories, resulting in more than twice as many labs in the afternoon than in the morning. The ratio has changed from 40-60% last year to 30-70% this year. Thus, it appears the tradition of having laboratories in the afternoon is growing.

The number of classes held during the week can also be plotted by the hours of the day, as in Figure 10. On this graph data for the past two years is shown, except for evening hours. It is obvious that new classes are still being scheduled during the most popular hours, making the load on facilities even heavier at those times.

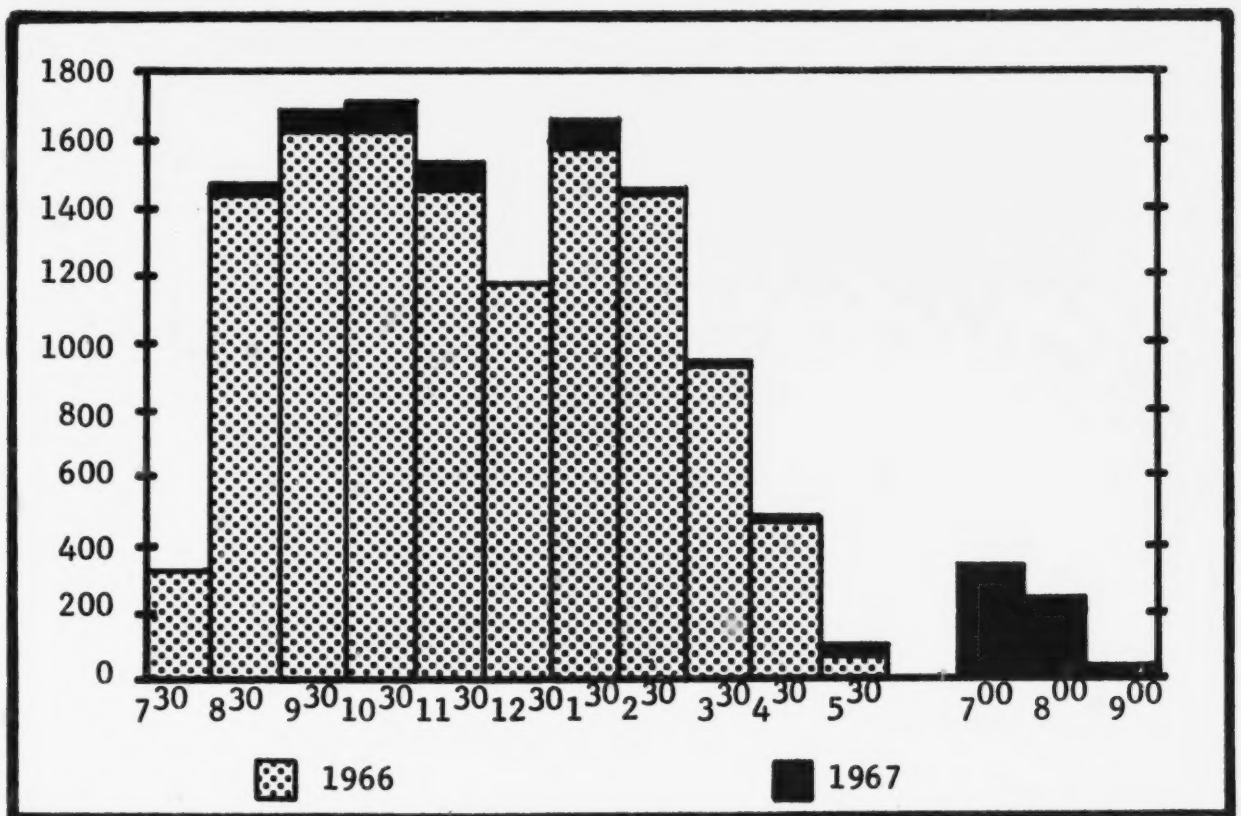

Figure 10. Number of Classes Per Week by Hour of Day

Figure 10, however, tells only part of the story. It does not show how many of the rooms available are in use at any one time. To do this, the utilization for one typical day is shown for each type in Figure 11. The number of rooms in use are calculated as a percentage of the total number available, without regard to size. Only scheduled class use is shown. Many rooms are being utilized for purposes other than scheduled classes, such as experiment set-up, special seminars, examinations, etc.

Figure 11, then, gives a general idea of the unused capacity in existing facilities. As previously stated, the utilization of labs is not subject to the same rules as general classrooms, so that this graph, while it does indicate intensity of use of labs, cannot be used as an indicator that increased utilization is possible.

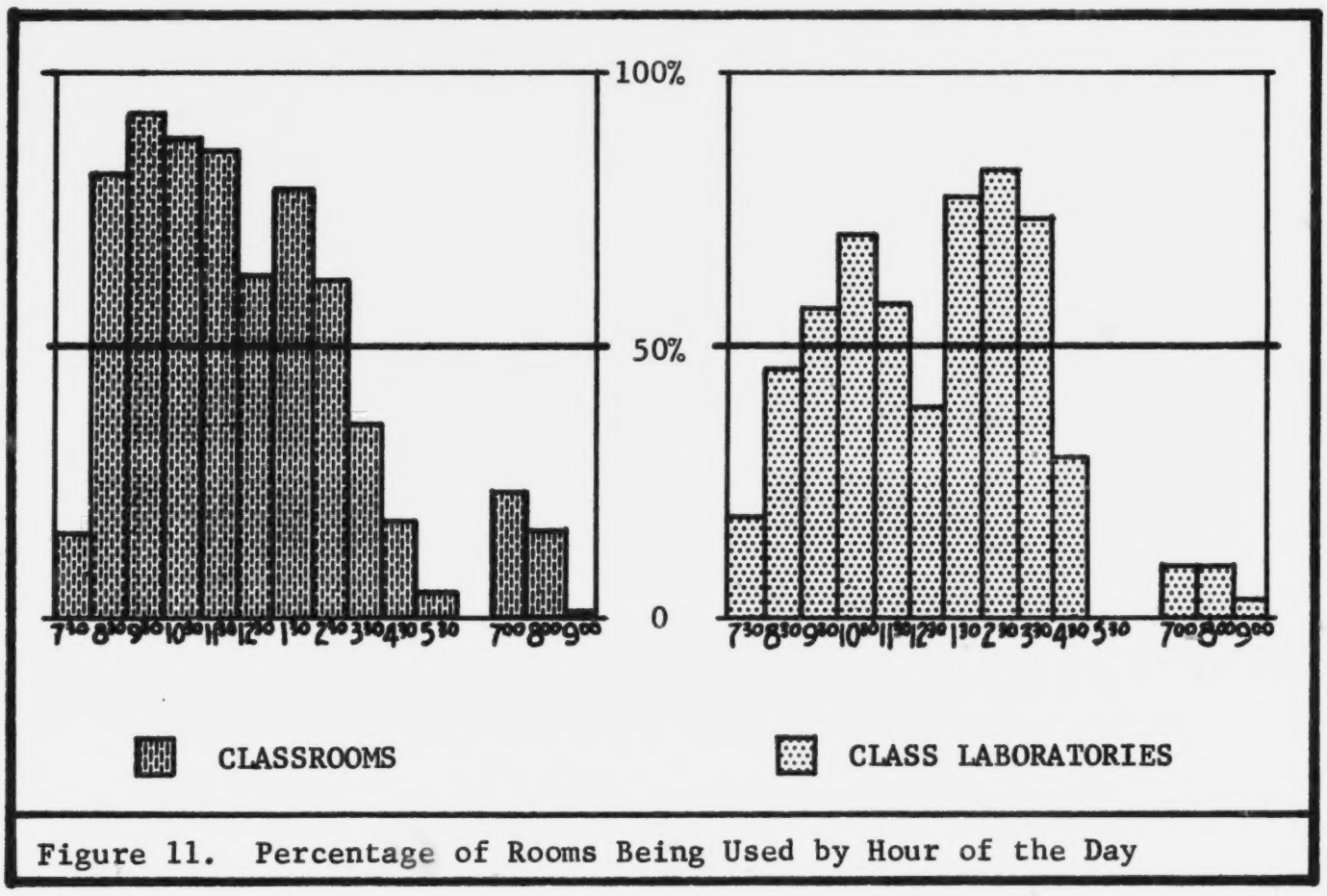

Figure 11. Percentage of Rooms Being Used by Hour of the Day

The data for both types of rooms combined shows that for six hours of every day between 70% and 80% of all 445 rooms are being used for a regularly scheduled class. For these six hours there remains very little flexibility in the scheduling process.

Higher use of class laboratories is made in the afternoon. This situation is difficult to change because of the unique nature of the labs and also because of the sequential scheduling with morning lecture classes. Classroom use is very high during the morning, to 92% at 9:30, and falls off rapidly in the afternoon after 3:30.

The most popular class hour remains 9:30 a.m. on Monday, when 10,959 students were in a scheduled class.

X. Fullness by Room Size:

The information on previous pages, in showing rooms in use at various times, indicates when new classes can be scheduled. Another measure of utilization is the number of seats occupied when a class is in session. Overall fullness by room type has already been discussed, Figure 12 shows it by room size. The lines drawn at 60% and 80% are the utilization goals for classrooms and class laboratories respectively.

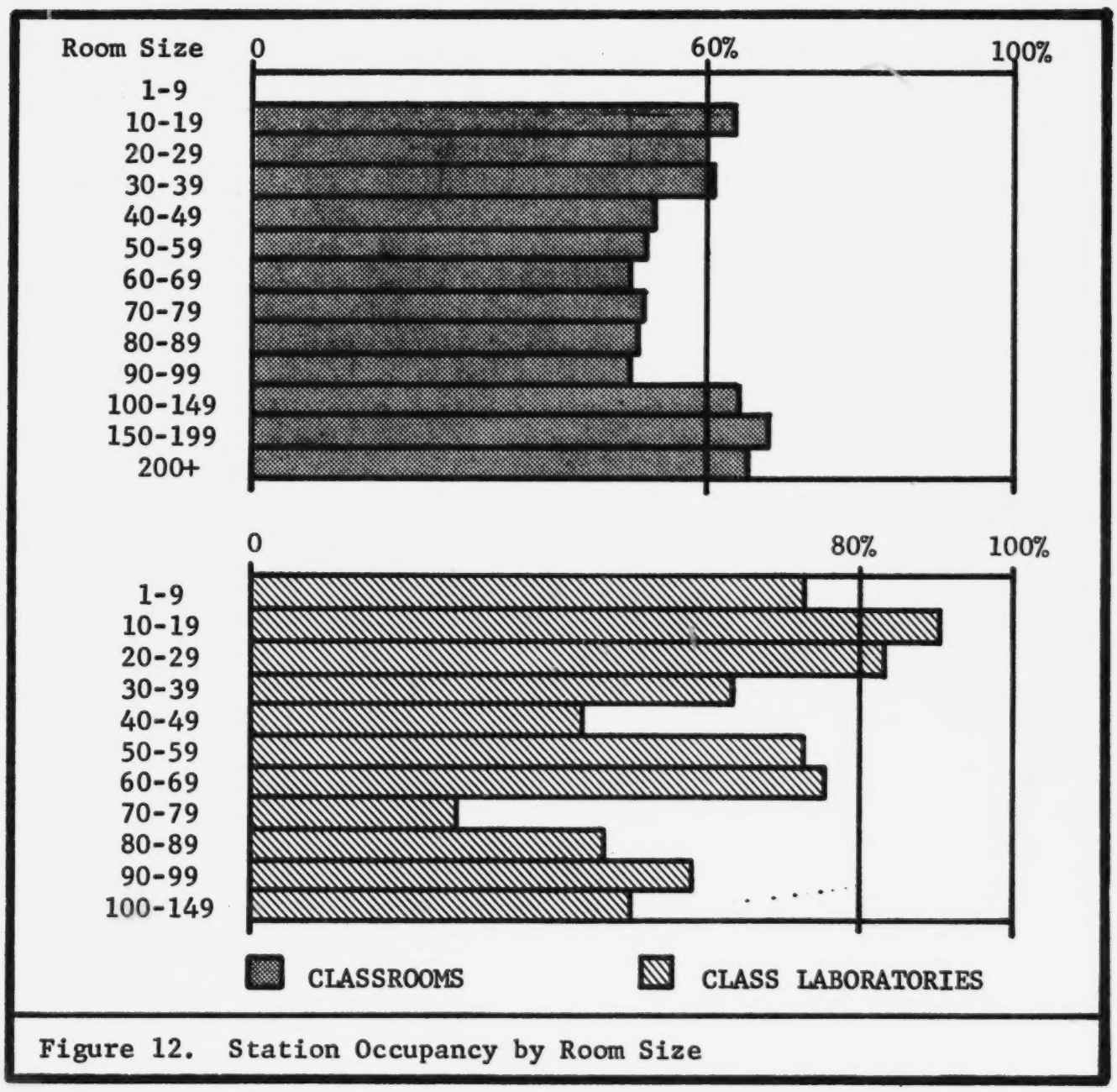

Figure 12. Station Occupancy by Room Size

The smallest and largest classrooms are most fully utilized. When academic plans permit, every effort should be made to provide additional rooms in these two sizes. The graph above also shows there is more need for two classrooms with a capacity of 30 than for one with a capacity of 60.

XI. Class Size vs. Room Size:

A comparison of the size of classes to the size of rooms in which they are held is another important part of a facility utilization study. Space for additional students might be found by a closer matching of class size to room size.

It is unlikely that an exact match between classes and rooms can be attained, because class size is determined by academic policy and is subject to change. Often the supply of rooms is not suitable for present teaching methods.

There is a great disparity between the number of small classes offered and the sizes of rooms now on hand. Figure 13 shows that small

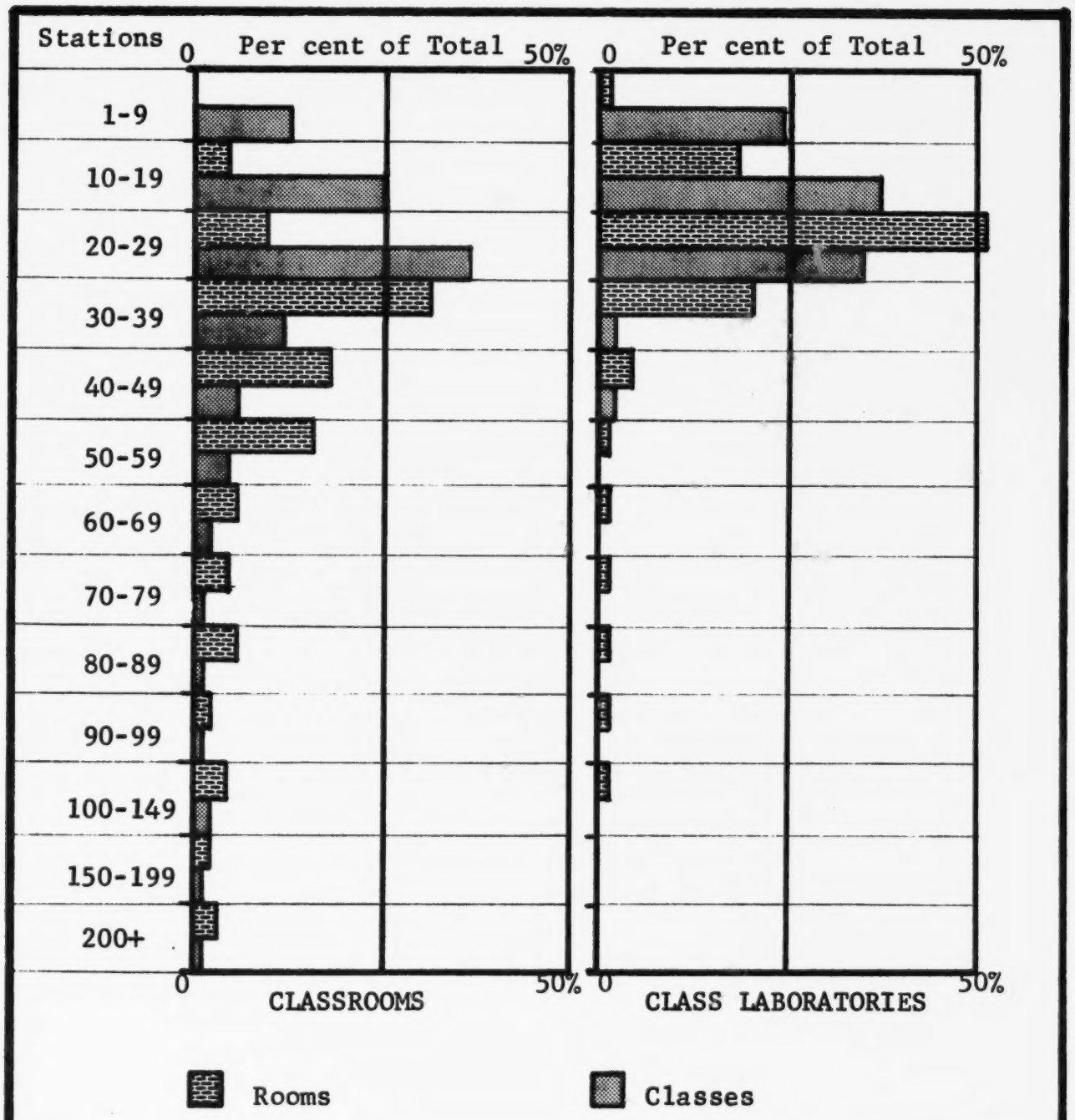

Figure 13. Sizes of Classes and Sizes of Rooms Available

classes of less than 30 students accounted for 71% of all those offered last Autumn Quarter. Yet, only 15% of the rooms are in this size category. Of the 319 rooms available, more than 200 should be in this range (instead of the current 42) to fit the teaching program. Again, it is clear there are too many middle-sized classrooms (from 50 to 90) for the academic program.

A similar imbalance exists with regard to class laboratories, although the nature of lab classes makes the comparison less meaningful. Even so, more thought should be given to remodeling some of the larger labs into a number of small ones. The six labs of over 50 capacity seem to constitute a great deal of waste space.

It appears that when new classrooms are programmed they should be at the small end of the scale unless an academic decision is made to increase the size of most lower division courses.

XII. Measurement of the Intensity of Use:

This report has investigated the utilization of instructional facilities by first looking at the amount of space available, then how it is being used. The third step involves conclusions about the need for new space, given the current supply of rooms and the pattern of academic instruction. The choice is whether more effort can be made to increase utilization or whether new classrooms should be built.

The measure of the need for new classrooms is "the number of square feet available per 100 hours of occupancy". This figure is valuable because it provides in one number a description of the intensity of use without talking about room periods or student stations. It thus provides a good index of classroom scheduling and utilization in one number.

SQUARE FEET PER 100 HOURS OF OCCUPANCY

	Total Square Feet		Enrollment Hours			Square Feet Per 100 Hours
Classrooms	243,471	÷	310,574	x 100	=	78.4
Class Laboratories	144,379	÷	53,491	x 100	=	269.9

It should be pointed out that a low value indicates high use. For example, a room of 600 square feet of floor area scheduled 30 hours a week with an average class size of 20 would result in 100 square feet per 100 hours of student occupancy. The same room scheduled 20 hours would yield 150 square feet per 100 hours.

Because laboratories are used less than classrooms and the number of square feet per student is larger, there are about twice as many square feet per 100 hours in labs as in classrooms as a rule.

The table on the previous page shows the relationship between the space available and the intensity with which it is being used. It is a valuable index when new facilities are being considered. The low value for classrooms indicates extremely high utilization. Adding new rooms appears to be essential if additional students are to be admitted. For comparison, a recent study of a number of institutions gave an average of 169 square feet per 100 hours for classrooms and 452 for class laboratories.

XIII. The Need for New Classrooms:

This study has pointed out that new classrooms will be needed if the University is to provide places for new students. On the basis of data presented here, it is possible to estimate the added student capacity within existing and planned facilities and to thus provide for additional students.

The number of chairs in general-use classrooms are the basis for estimating student capacity. Goals of utilization have established 18 hours a week per chair (30 hours times 60%) as an average use. Present use is 17.3 hours per seat, consequently there is an unused capacity of 12,582 station-hours within existing classrooms.

The average student spends 12 hours a week in a classroom. This rates the additional capacity of existing rooms at 1,050 students.

This calculation assumes every classroom can be used at the rate established. This may or may not be the case, depending upon the building's location, or lack of needed equipment, or the necessity of providing some space for special events. Without the addition of new classrooms, facilities would be inadequate for Autumn Quarter of 1968, when an increase of at least 1,100 students is expected.

The new classrooms in the Engineering Classroom-Library Building are badly needed to accommodate the fall enrollment. This building contains 832 new student stations, of which 736 will be for general assignment. This will provide space for an additional 1,100 students, or (combined with the 1,050 capacity above) a total of 2,150 for the fall of 1968.

The addition of the new classrooms only keeps abreast of the enrollment increase and space again will be in short supply the next year. Efforts to prohibit the conversion of classrooms to other uses must be continued.

XIV. Conclusion:

A Summary of Findings is included at the beginning of this report. An additional word of caution should be added: A point can be reached at which excessive utilization will result in a decline of overall educational efficiency. While the use of physical facilities is being studied

continually and better means of utilization developed, a reserve of unscheduled time and space must be retained to support a well-balanced and operating teaching program.

The most recent enrollment projection (unofficial at this time) predicts a total enrollment of 34,000 students by 1970. This amounts to the addition of 4,000 students in two years. Recent studies by this office show that the average undergraduate spends 11.8 hours a week in a classroom, with an average class size of 31.8 students. Using these figures as a forecast base results in an additional 1,490 classroom hours a week in 1970. Average use of 30 hours a week per room predicts the need for 49 new classrooms by that time to take care of the increased enrollment. 22 classrooms will be added for Autumn Quarter, 1968 and an additional 2 classrooms for Winter Quarter, 1969.

Buildings to be completed in the fall of 1969 and 1970 that contain general assignment classrooms will be: Forest Sciences Building, Electrical Engineering Building Addition, and the Architecture Building. At this point it is unlikely that the additional 25 new classrooms needed will be available in 1970, and more intense use of existing rooms as well as conversion from other uses to classrooms will probably be necessary.

FACILITIES PLANNING AND CONSTRUCTION

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UNIVERSITY OF WASHINGTON
Facilities Planning and Construction

August, 1968

SPACE DISTRIBUTION STUDIES -- Report No. 2

SUBJECT: Description of Space Use

I. Summary of Findings:

1. The University was utilizing more than 8,000,000 gross square feet of floor area as of January 1, 1968. All space has been re-surveyed on the basis of a national classification system, with additional provisions to satisfy state requirements.

2. The rate of growth of the physical plant has not kept up with the rate of enrollment growth. In the past ten years the daytime enrollment has grown by 85%, but permanent additions to the physical plant by only 27%.

3. Residential Facilities currently account for 22% of the assignable area, Laboratory Facilities for 21%, and Office Facilities for 17%.

4. Living and learning space (the combination of instruction and residential area) accounts for almost 75% of the total available.

5. 53% of all floor area can be classified by subject field. Life Sciences accounts for 34% of this area; Mathematical-Computer-Physical-Engineering Sciences use 27%.

6. In a classification of floor area by function, direct instruction comprises 29% of the total.

7. The present decade is the period of greatest construction activity, with 27% of the total floor area having been built in only the last seven years. Half the floor area has been added since 1950.

8. About 14% of the floor area (about a million square feet) is 48 years old or more. Much of this space is in need of renovation.

9. The Ten-Year Study showed that while the total assignable square feet per student has increased over the last decade, this increase has been almost wholly in residential space. Classrooms, offices, laboratories, and study facilities have all declined.

10. The last ten years have seen a decrease in space per student for instruction. Space for research, public service, and library facilities has remained approximately the same.

11. The Ten-Year Study showed that only the Life Sciences have shown a small increase in square feet per student. The Behavioral Sciences, Humanities, and Physical Education-Military Sciences show a substantial decline.

II. Introduction:

Increasing enrollment in higher education has generated the need for additional facilities at most institutions. The University of Washington is no exception. The growth in daytime enrollment in the decade between Autumn Quarters of 1957 and 1967 has been a phenomenal 85%. This growth has put tremendous pressure on the University to provide space for the additional students.

Projections of enrollment indicate that the student body will continue to increase. But even more important, its composition will change as the University becomes more selective and opportunities for undergraduate education at community colleges increase. The rising total enrollment will not only require additional facilities, but the change in student mix will also generate demands for specific types of space. Advance planning to provide the kind of facilities necessary in the future must grow out of the knowledge of the present physical plant and how it is being used.

For a number of years the University has had an inventory of all floor area and periodic studies of the use of space have been made. The last year, however, has brought about significant changes in the space classification system. The refinement of the system provides a substantial amount of detailed information that will assist in planning for future growth.

The refinement of the space classification system was the result of work of the State Task Force which, under a grant from the Higher Education Facilities Commission, wrote a new inventory manual. This manual essentially conforms to a federally established system of inventory with some additional provisions to satisfy requirements of State agencies.

All space has been re-surveyed in the last year on the basis of the new system. This system is a significant advance because it permits the comparison of data, not only for public and private institutions in the State, but nation-wide as well. The Manual lists some of the uses of the data collected in the inventory as follows:

- Description of space quantitatively and qualitatively.
- Description of space by type, by organizational unit, and by function.
- Assignment of space appropriate to organizational units.
- Conversion of space from one use to another.
- Projection of long-range building needs.
- Planning specific building projects.
- Determination of operating and capital budget requests.

- Determination of indirect cost rates for sponsored projects.
- Rehabilitation needs.
- Comparison with other institutions.
- Interpretation of needs to many public groups.

III. Inventory of Physical Facilities:

Two types of inventories are required: by building and by room. The collection of building data has not yet been completed, but the conversion of room data from the old system to the new was finished in the summer and fall of 1967. Records are available for all buildings including residential and off-campus facilities.

The new system identifies several attributes of space that are helpful in planning for further additions. These are:

(1) Type of room -- for example, classroom, office, lounge.

(2) Organizational unit to which the room is assigned -- for example, administration, library, departments of instruction and research.

(3) Subject field of the department using the room -- for example, physical science, education, fine arts.

(4) Function of the space -- for example, instruction, research, public service.

Each room is classified according to these four dimensions. The basis for measuring each room is the assignable area. Floor area is summarized and reported for each building in four ways: assignable, unassignable, construction, and gross area. The following definitions are used in reporting these areas in the space inventory:

Assignable area -- All areas on all floors of a building assigned to, or available for assignment to, an occupant, including every type of space functionally usable by an occupant.

Non-assignable area -- All areas not assignable to an occupant, including circulation, custodial, and mechanical areas.

Construction area -- The portion of gross area that cannot be put to use because of the presence of structural features of the building.

Gross area -- The sum of the floor areas included within the outside faces of exterior walls for all stories, or areas, which have floor surfaces.

It is important that these elements be understood when the data is utilized for space management, for planning future facilities, or in making comparative space studies.

IV. Total Facilities Available:

On January 1, 1968 the University was utilizing 8,196,190 gross square feet of floor area. This figure includes all kinds of space at all locations. Some facilities are at off-campus locations such as Friday Harbor, Pack Forest and West Seattle. The total is constantly changing due to new construction, remodeling, and demolition activities.

The total represents about 273 gross square feet per student for each of the 29,977 enrolled in the Autumn Quarter of 1967.

At the time the previous space report was made two years ago, the amount of total interior space per student was 247 square feet. The figure now is 239 interior square feet per student, a decline of 3%. This comparison points out that while it sometimes appears that the rate of growth of the physical plant is accelerated, in reality it has not kept up with the enrollment growth rate. In the last ten years enrollment has grown 85%, but permanent additions to the physical plant have only increased at a 27% rate.

The Statement of Investment in Physical Plant published June 30, 1967 shows a total investment of $214,194,463. This is an average of $7,145 per student enrolled and an average value of $26.13 per gross square foot.

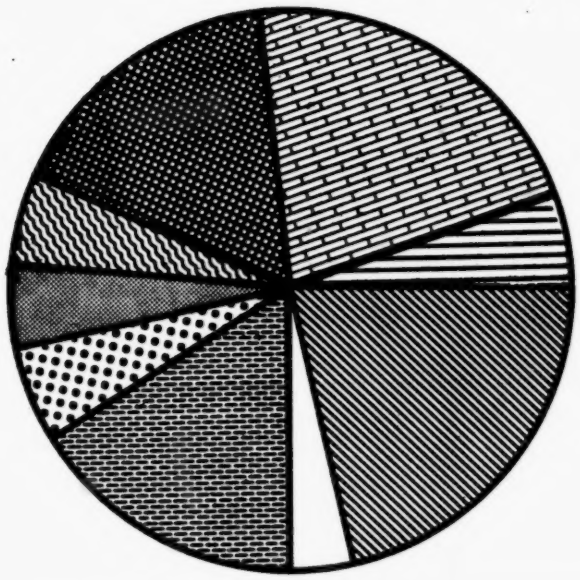
V. Summaries by Category:

As stated previously, each room is rated and classified in four ways: by type of room, by the organizational unit to which it is assigned, by the subject field concerned, and by the function it serves. Schedules 1 to 4 in the Appendix give the detailed breakdown by subdivisions.

A. By Room Type:

The classification of existing building space by type of room points out the large amount of space devoted to residential use, about 22% of the total. This is a decline in the last two years of about 2%.

Laboratories and Offices, with their related service areas, are the two major kinds of rooms. The figure for Supporting Facilities is misleading because three-fourths of the space included here is in parking garages. The remainder of the space is about evenly divided among the remaining categories.



Type of Facilities	Percent
Classroom	5.4
Laboratory	21.1
Office	16.7
Study	5.4
Special Use	4.8
General Use	5.6
Supporting	15.9
Medical Care	3.5
Total Non-Residential	78.4
Residential	21.6
Total	100.0

Figure 1. Assignable Area by Room Type

B. By Organizational Unit:

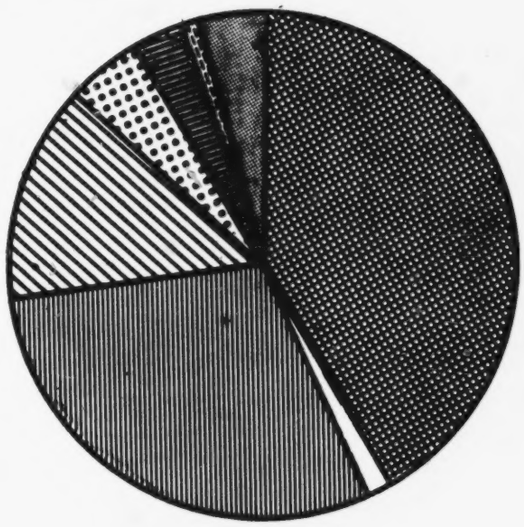
Institutions may vary widely by organization, but despite this, certain elements are common to most. The description of space by the organizational unit to which the occupying department belongs is shown in Figure 2 on the next page.

The chart shows that by far the largest user of space is the collection of regular teaching departments, here called Departments of Instruction and Research. Auxiliary Services, which includes residential space, is second. Again, the inclusion of parking garages tends to distort the figure for General Administration and Institutional Services. In Schedule 2 in the Appendix this category is further subdivided into administrative, student service, and physical plant space. This gives a clearer picture of the space used by administrative units.

Living and learning space, the combination of instructional and residential area, accounts for almost 75% of the total available.

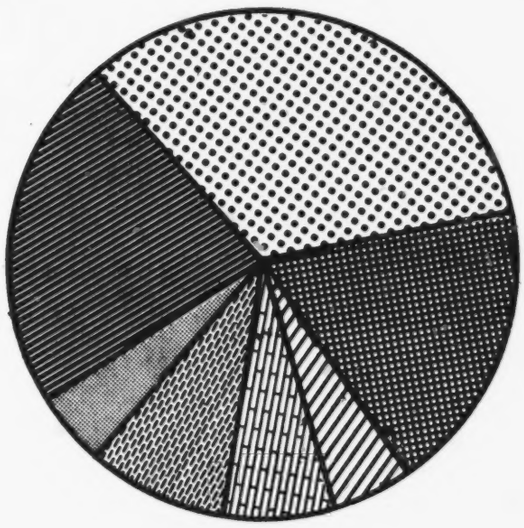
C. By Subject Field:

Five of the organizational unit categories (Departments of Instruction and Research, Organized Activities, Organized Research, Public Service, and Library) can be classified by subject field. The total amount of space involved is 2,910,416 assignable square feet, or 53% of the total assignable area.



Unit	Percent
Departments of Instruction and Research	40.6
Organized Activity Units	4.7
Organized Research Units	.9
Public Service Units	2.0
Library	5.2
General Administration & Institutional Services	14.1
Auxiliary Services	31.2
Non-Institutional Agencies	1.3
Total	100.0

Figure 2. Assignable Area by Organizational Unit



Subject Field	Percent
General	18.3
Life Sciences	33.7
M.C.P.E. Sciences	22.6
Behavioral Sciences	4.8
Humanities	8.6
Professions	7.0
Physical Education and Military Sciences	5.0
Total	100.0

Figure 3. Assignable Area by Subject Field

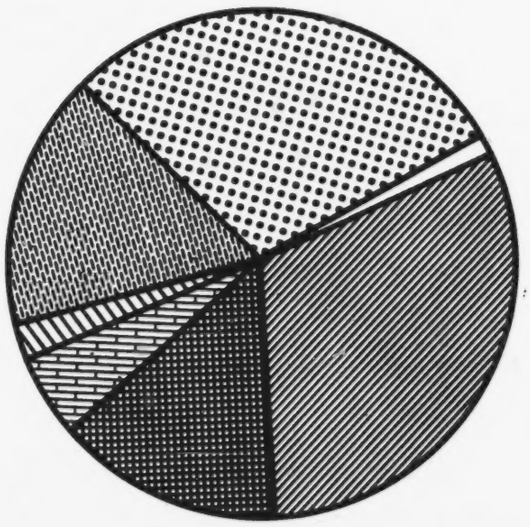
By far the largest user of space is the Life Sciences, which occupies fully one-third of all floor area. Second is the M.C.P.E. (Mathematical, Computer, Physical, and Engineering) Sciences, and third largest is the General category, which includes classrooms and other spaces used by more than one discipline. A further breakdown by department groupings is given in the Appendix.

D. By Function:

The classification of space by function is the most difficult part of the inventory, and yet one of the most important. The difficult part is the differentiation between instruction, research, and public service. A faculty office, for instance, often serves two, if not all three, of those functions.

Techniques to classify space by function are still being improved, but the divisions shown in Figure 4 are felt to be generally accurate. Auxiliary Services, which includes residential area, is still the largest user of space, but the Instruction category is nearly as large. Together they comprise 60% of the total. The inclusion of parking garages distorts the figure for General Administration and Institutional Services.

Space for direct instruction comprises 30% of the total for the University.



Function	Percent
Instruction	29.4
Research	16.5
Public Service	2.2
Library	5.2
General Administration & Institutional Services	14.2
Auxiliary Services	31.2
Non-Institutional Agencies	1.3
	100.0

Figure 4. Assignable Area by Function

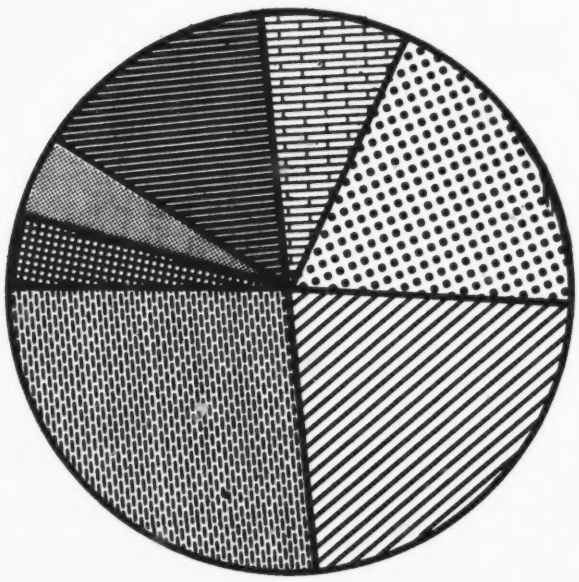
VI. Age of Building Space:

A graph of floor area by date of construction or acquisition is shown in Figure 5. The present decade is obviously the period of greatest construction activity, with 27% of the total having been built in the first seven years of the decade. Exactly half of the floor area at the University has been built since 1950.

While about 9% of the floor area is more than 48 years old, many of the buildings included have been extensively remodeled. Those built

during the twenties, however, are in need of extensive renovation in many cases. The total is about 14% of the floor area and includes more than a million square feet. Remodeling funds must be requested so that the space can be made more efficient and usable.

A list of buildings by construction date shows that the rate of increase in permanent facilities in the past decade (1957-1967) has been 27%. In the same period the daytime enrollment has increased by 85%.



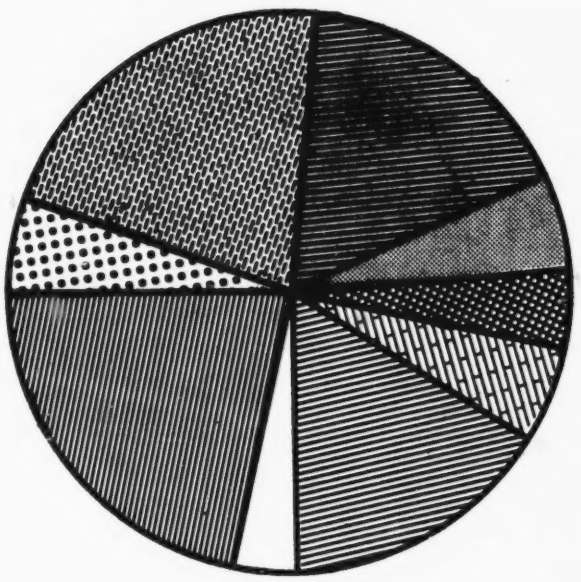
Decade	Percent
1895 - 1910	4.3
1911 - 1920	4.8
1921 - 1930	14.3
1931 - 1940	8.4
1941 - 1950	19.0
1951 - 1960	22.6
1961 - 1967	26.6
	100.0

Figure 5. Gross Floor Area by Date of Construction or Acquisition

VII. Square Feet Per Student:

The assignable space per student enrolled in the Autumn Quarter, 1967 is shown in Figure 6 on the next page. What constitutes an adequate allowance for each category is still under investigation at this time, but the amount should not be the same in each. The total amount has increased by 8½ square feet per student in the two years since the last report, and includes all substandard area acquired west of the main campus.

Classroom space per student has declined in two years from 10.7 to 9.8 square feet. Classrooms are very intensively used and the addition of 24 rooms by Autumn Quarter, 1968 will again provide some flexibility in class scheduling as well as space for new students. The University is expected to have a smaller amount of classroom space per student because of its size and varied program, but without these new rooms the class scheduling situation would be critical. Smaller institutions that do not have a research program or specialized teaching facilities have a larger amount of space for general instruction.

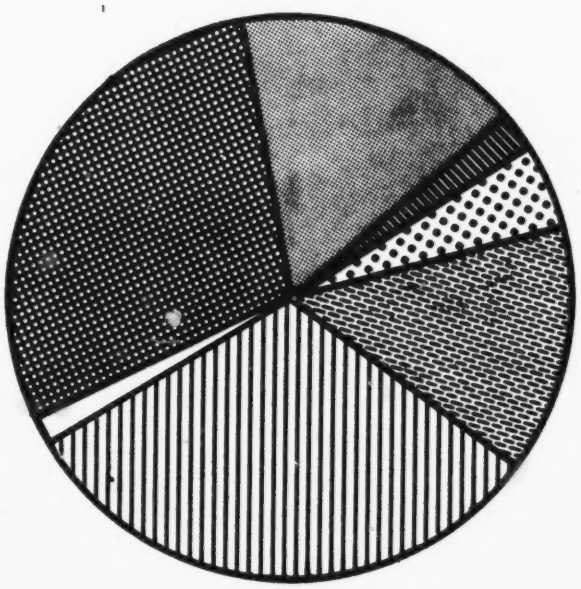


Type of Facilities	Square Feet
Classroom	9.8
Laboratory	38.4
Office	30.5
Study	9.8
Special Use	8.7
General Use	10.1
Supporting	28.8
Medical Care	6.3
Total Non-Residential	142.4
Residential	39.4
Total	181.8

Figure 6. Assignable Square Feet Per Student by Room Type

The main types of rooms on campus are laboratories and offices and their related service areas. The inclusion of parking garages in the supporting facilities category distorts that figure.

Figure 7 shows the amount of assignable square feet per student according to the function of the space.



Function	Square Feet
Instruction	53.4
Research	30.1
Public Service	4.1
Library	9.4
General Administration & Institutional Svcs.	25.8
Auxiliary Services	56.7
Non-Institutional Agencies	2.3
Total	181.8

Figure 7. Assignable Square Feet Per Student by Function

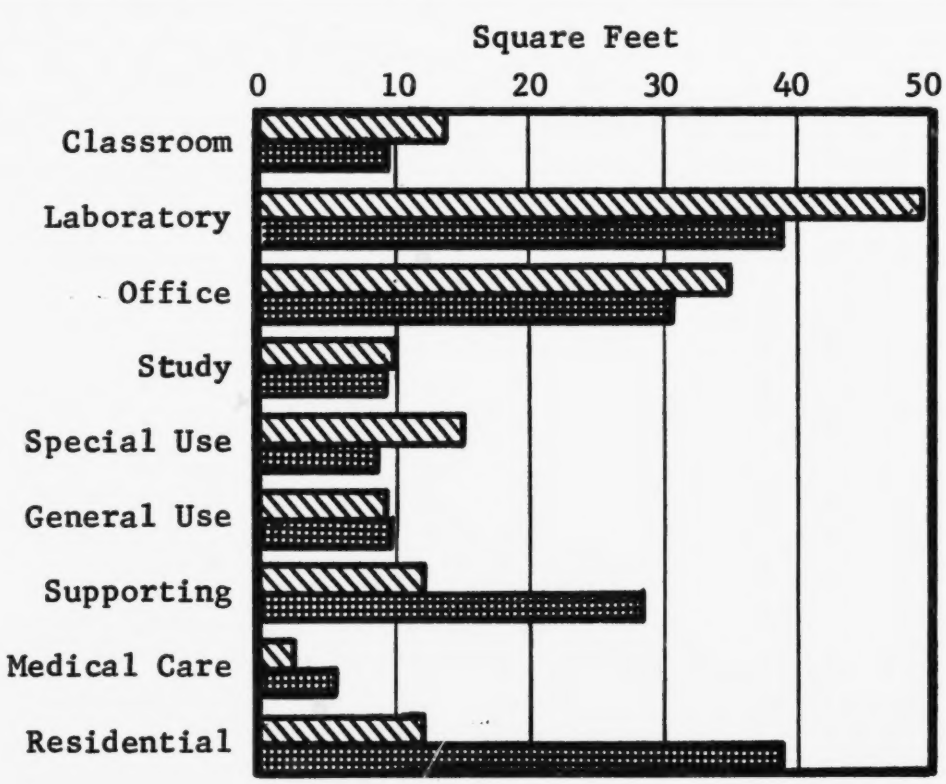
When all space is classified by the actual function it serves, it is interesting that Instruction is second only by a small amount to Auxiliary Services, which includes all residential space. There is about twice as much space for instruction as for research.

VIII. Ten Year Study: 1957 and 1967:

A recent study by this office made a comparison of facilities at the University in 1957 and 1967. Conditions existing in 1957 were reconstructed as accurately as possible from room inventory records and others. Information on floor area was related to student enrollment in each Autumn Quarter so that changes could be related to a common base. While there may have been an overall increase in the total amount of a certain type of space, the amount per student might actually have declined.

A. By Room Type:

Figure 8 compares floor space by room type at the beginning and the end of the ten-year period. The graph shows that while the total assignable square feet per student has increased in the last ten years, this increase has been almost totally in residential space, which grew more than three-fold. Supporting facilities show a large increase because of the addition of parking garages.



	Square Feet 1957	1967
Classroom	13.9	9.8
Laboratory	49.5	38.4
Office	34.8	30.5
Study	10.5	9.8
Special Use	15.2	8.7
General Use	9.6	10.1
Supporting	12.7	28.8
Medical Care	3.3	6.3
Residential	12.7	39.4
	162.2	181.8

Figure 8. Square Feet Per Student by Room Type, 1957 and 1967

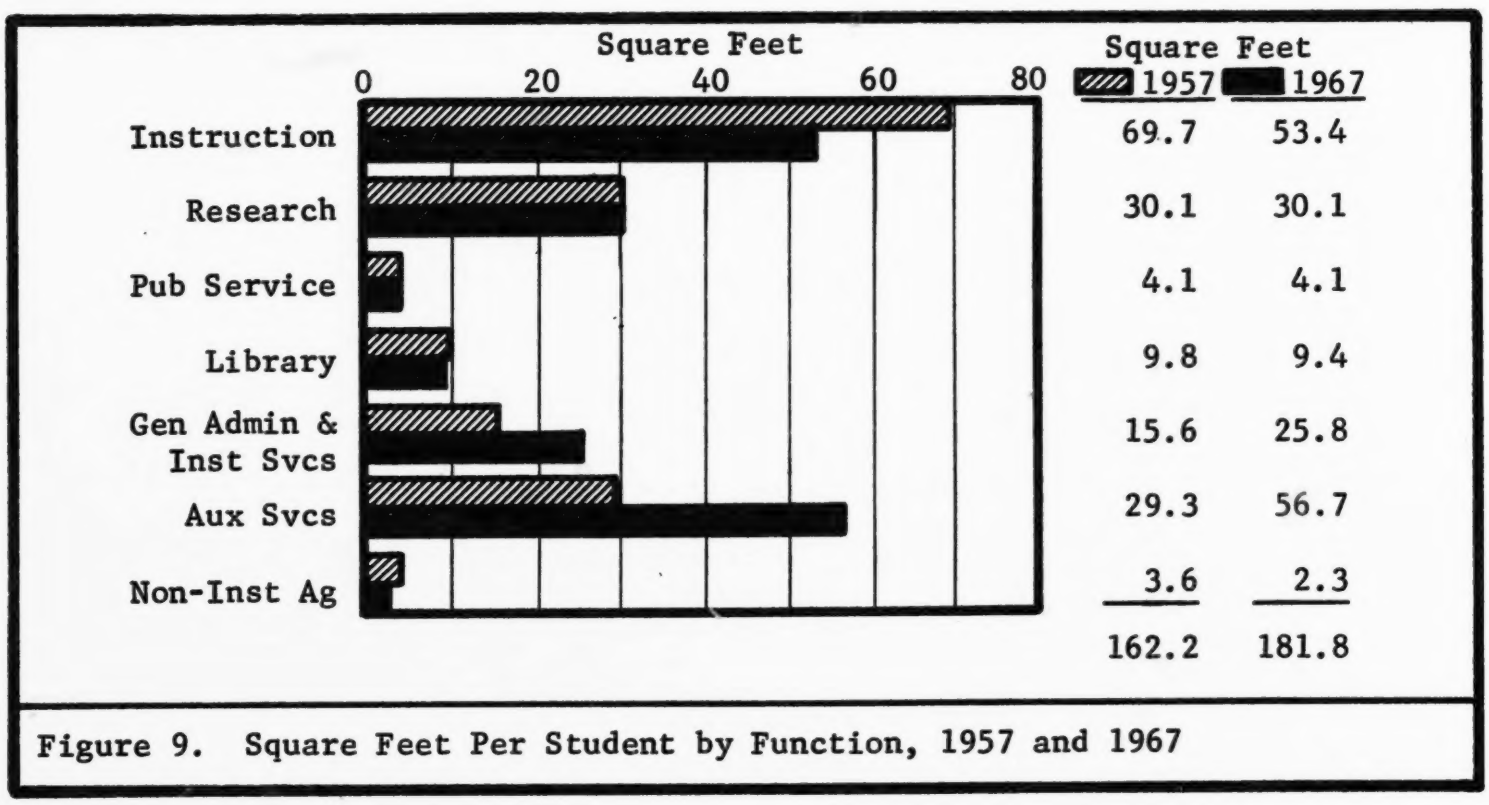
It is fairly obvious that emphasis in the past decade has been on increasing auxiliary space. Classrooms, laboratories, offices, and study facilities have all declined in the amount of space per student.

B. By Function:

The changes in square feet per student over the last ten years can also be studied by function, as in Figure 9. Again the increase in Auziliary Facilities (mainly residential) and Institutional Services (mainly parking garages) is evident.

The decrease in the amount of space per student devoted to Instruction is rather alarming. Only by more intensive utilization of facilities such as classrooms, offices, and laboratories has the University been able to accommodate the additional students. Space for research, public service and library use has remained substantially the same.

Almost one-third of the assignable area per student is for instruction, and another third for housing. The remaining third is about half each of research facilities and institutional services (parking garages).



	Square Feet 1957	1967
Instruction	69.7	53.4
Research	30.1	30.1
Pub Service	4.1	4.1
Library	9.8	9.4
Gen Admin & Inst Svcs	15.6	25.8
Aux Svcs	29.3	56.7
Non-Inst Ag	3.6	2.3
	162.2	181.8

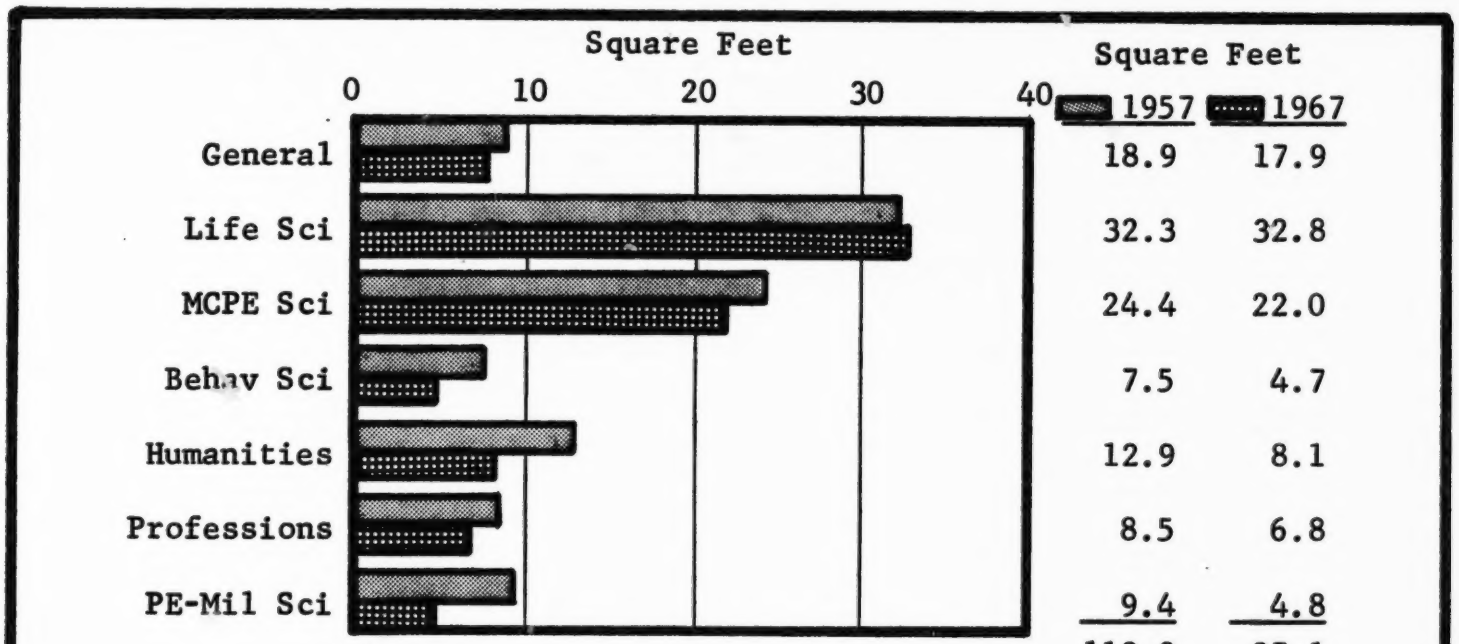
Figure 9. Square Feet Per Student by Function, 1957 and 1967

C. By Subject Field:

The space that may be classified by subject field represents 53% of the total assignable area. Figure 10 shows the changes over the last ten years related to the total number of students enrolled at the University.

Immediately apparent is the overall decline in the amount of space per student. All the space assigned to the first five organizational units can be classified by subject field. This includes all space assigned to Departments of Instruction and Research, Organized Activities, Organized Research, Public Service, and Library. The decline in space per student comes from the elimination of residential area from the calculations.

Only the Life Sciences division showed a small increase in the last ten years, reflecting the active building program in the health sciences area. All other divisions declined in space per student, especially the Behavioral Sciences, Humanities, and Physical Education-Military Sciences.



	Square Feet 1957	1967
General	18.9	17.9
Life Sci	32.3	32.8
MCPE Sci	24.4	22.0
Behav Sci	7.5	4.7
Humanities	12.9	8.1
Professions	8.5	6.8
PE-Mil Sci	9.4	4.8
	113.9	97.1

Figure 10. Square Feet Per Student by Subject Field, 1957 and 1967

D. By Organizational Unit:

The change by organizational unit to which the occupying department is assigned is shown in Figure 11. All divisions showed a decrease except Organized Activities, Institutional Services and Auxiliary Services. Again, the addition of residential space is the major part of the increase.

Even though the total amount of floor area per student increased in the ten-year period, the amount assigned to Departments of Instruction and Research decreased substantially. Organized Activity Units more than doubled, primarily because of additions to the teaching hospital.

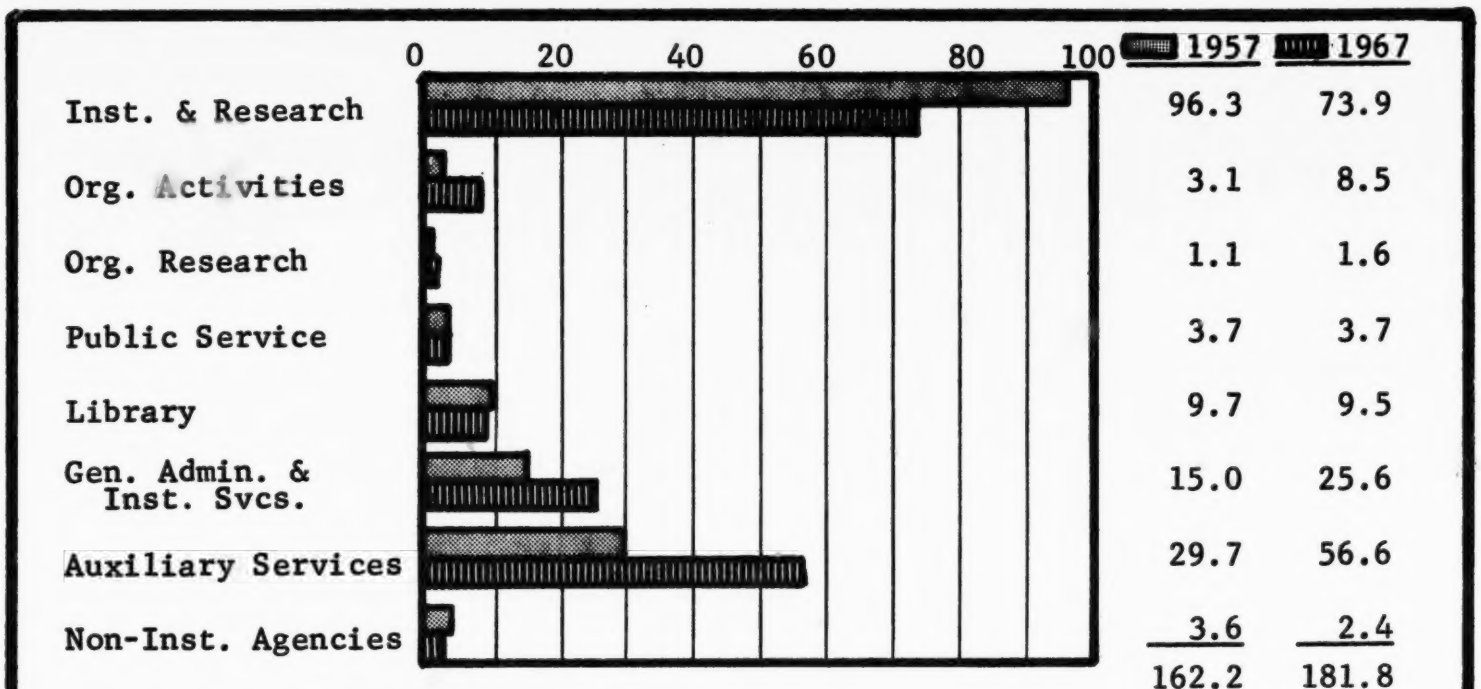


Figure 11. Square Feet Per Student by Organizational Unit, 1957 and 1967

IX. Conclusions:

A Summary of Findings is made at the beginning of this report.

The development of the new facilities inventory system marks a significant step in the study of the University's physical facilities. This information will serve as an important base on which to project the need for additional facilities, on which the long-range capital construction program will be based. A major effort in the coming year will be the establishment of a method of projecting the need for space by discipline and function.

The fact that this system is nation-wide will permit the University to compare its physical resources with those of other institutions in the State and with other similar institutions in the country.

FACILITIES PLANNING AND CONSTRUCTION

Norma Olsonoski
Planning Analyst

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UNIVERSITY OF WASHINGTON
FACILITIES PLANNING AND CONSTRUCTION

SCHEDULE 1 -- TOTAL CAMPUS FLOOR AREA BY TYPE OF ROOM

	TYPE OF ROOM	ASSIGNABLE SQUARE FEET
100	CLASSROOM FACILITIES	292,566
110	CLASSROOM	266,310
115	CLASSROOM SERVICE	26,256
200	LABORATORY FACILITIES	1,150,261
210	CLASS LABORATORY	180,490
215	CLASS LABORATORY SERVICE	89,772
220	SPECIAL CLASS LABORATORY	62,152
225	SPECIAL CLASS LABORATORY SERVICE	14,526
230	INDIVIDUAL STUDY LABORATORY	14,459
235	INDIVIDUAL STUDY LABORATORY SERVICE	2,117
250	NON-CLASS LABORATORY	550,481
255	NON-CLASS LABORATORY SERVICE	236,264
300	OFFICE FACILITIES	913,309
310	OFFICE	709,553
315	OFFICE SERVICE	139,566
350	CONFERENCE ROOM	63,318
355	CONFERENCE ROOM SERVICE	872
400	STUDY FACILITIES	293,262
410	STUDY ROOMS	100,234
420	STACK	115,476
430	OPEN-STACK READING ROOMS	37,147
440	LIBRARY PROCESSING ROOMS	36,842
455	STUDY FACILITIES SERVICE	3,563
500	SPECIAL-USE FACILITIES	260,260
510	ARMORY FACILITIES	
515	ARMORY FACILITIES SERVICE	2,316
520	ATHLETIC-PHYSICAL EDUCATION FACIL	60,040
523	ATHLETIC-FACIL SPECTATOR SEATING	78,346
525	ATHLETIC-PHYSICAL EDUC FACIL SVC	84,017
530	AUDIO-VISUAL, RADIO, TV FACILITIES	8,385
535	AUDIO-VISUAL, RADIO, TV FACIL SVC	9,565
540	CLINIC FACILITIES (NON-MEDICAL)	1,356
545	CLINIC FACIL SVC (NON-MEDICAL)	486
550	DEMONSTRATION FACILITIES	15,749
555	DEMONSTRATION FACILITIES SERVICE	
560	FIELD SERVICE FACILITIES	

UNIVERSITY OF WASHINGTON
FACILITIES PLANNING AND CONSTRUCTION

SCHEDULE 1 -- TOTAL CAMPUS FLOOR AREA BY TYPE OF ROOM

	TYPE OF ROOM	ASSIGNABLE SQUARE FEET
600	GENERAL-USE FACILITIES	303,831
610	ASSEMBLY FACILITIES	26,309
615	ASSEMBLY FACILITIES SERVICE	12,399
620	EXHIBITION FACILITIES	25,078
625	EXHIBITION FACILITIES SERVICE	18,974
630	FOOD FACILITIES	67,697
635	FOOD FACILITIES SERVICE	28,858
640	HEALTH FACILITIES (STUDENT)	4,927
645	HEALTH FACILITIES SVC (STUDENT)	5,760
650	LOUNGE FACILITIES	62,223
655	LOUNGE FACILITIES SERVICE	2,398
660	MERCHANDISING FACILITIES	14,402
665	MERCHANDISING FACILITIES SERVICE	312
670	RECREATION FACILITIES	30,201
675	RECREATION FACILITIES SERVICE	4,293
700	SUPPORTING FACILITIES	866,520
710	DATA PROCESSING-COMPUTER FACIL	9,550
715	DATA PROCESSING-COMPUTER FACIL SVC	1,824
720	SHOP FACILITIES	142,044
725	SHOP FACILITIES SERVICE	5,941
730	STORAGE FACILITIES	65,828
735	STORAGE FACILITIES SERVICE	571,369
740	VEHICLE STORAGE	14,999
745	VEHICLE STORAGE SERVICE	54,965
790	OTHER SUPPORTING FACILITIES	
795	OTHER SUPPORTING FACILITIES SVC	
800	MEDICAL CARE FACILITIES	189,578
810	HUMAN HOSPITAL-CLINIC FACILITIES	63,932
815	HUMAN HOSPITAL-CLINIC FACIL SVC	6,385
820	HUMAN HOSPITAL-PATIENT CARE FACIL	43,389
825	HUMAN HOSP-PATIENT CARE FACIL SVC	50,278
830	HUMAN HOSP-CLINIC STAFF QUARTERS	2,666
840	DENTAL CLINIC FACILITIES	20,008
845	DENTAL CLINIC FACILITIES SERVICE	2,920
	SUBTOTAL -- NONRESIDENTIAL FACILITIES	4,269,587

UNIVERSITY OF WASHINGTON
FACILITIES PLANNING AND CONSTRUCTION

SCHEDULE 1 -- TOTAL CAMPUS FLOOR AREA BY TYPE OF ROOM

	TYPE OF ROOM	ASSIGNABLE SQUARE FEET	
900	RESIDENTIAL FACILITIES		
910	RESIDENCE FOR SINGLE PERSONS		713,107
911	STUDY-BEDROOMS	357,485	
912	LOUNGE-RECREATION ROOMS	127,382	
913	STAFF QUARTERS-GUEST ROOMS	15,928	
914	LAUNDRY ROOMS-STORAGE	53,068	
915	KITCHEN-DINING ROOMS	102,366	
916	RESTROOMS-SHOWERS	56,878	
920	ONE-FAMILY DWELLING		89,094
930	MULTIPLE FAMILY DWELLING		367,258
935	MULTIPLE FAMILY DWELLING SERVICE		9,900
940	CENTRAL FOOD STORES		
950	CENTRAL LAUNDRY		411
	SUBTOTAL -- RESIDENTIAL FACILITIES		1,179,770
	TOTAL ASSIGNABLE AREA		5,449,357
000	UNASSIGNABLE AREA		
10	CUSTODIAL AREA	56,467	
20	CIRCULATION AREA	1,141,954	
30	MECHANICAL AREA	524,711	
	SUBTOTAL -- UNASSIGNABLE AREA		1,723,132
	TOTAL INTERIOR FLOOR AREA		7,172,489
	CONSTRUCTION AREA		1,023,701
	TOTAL GROSS FLOOR AREA		8,196,190

UNIVERSITY OF WASHINGTON
FACILITIES PLANNING AND CONSTRUCTION

SCHEDULE 2 -- TOTAL CAMPUS FLOOR AREA BY ORGANIZATIONAL UNIT

	ORGANIZATIONAL UNIT		ASSIGNABLE SQUARE FEET
10	DEPARTMENTS OF INSTRUCTION AND RESEARCH		2,213,130
20	ORGANIZED ACTIVITY UNITS		254,571
30	ORGANIZED RESEARCH UNITS		48,704
40	PUBLIC SERVICE UNITS		110,195
50	LIBRARY		283,096
60	GENERAL ADMINISTRATION AND INSTITUTIONAL SERVICES		766,582
	61 GENERAL ADMINISTRATION	122,053	
	62 STUDENT SERVICES	46,405	
	63 PHYSICAL PLANT	596,610	
70	AUXILIARY SERVICES		1,703,914
80	NON-INSTITUTIONAL AGENCIES		69,165
	SUBTOTAL -- ASSIGNABLE AREA		5,449,357
90	UNASSIGNABLE AREA		1,723,132
	TOTAL INTERIOR FLOOR AREA		7,172,489

UNIVERSITY OF WASHINGTON
FACILITIES PLANNING AND CONSTRUCTION

SCHEDULE 3 -- FLOOR AREA CLASSIFIED BY SUBJECT FIELD

	SUBJECT FIELD		ASSIGNABLE SQUARE FEET
100	GENERAL		534,550
110	GENERAL	265,729	
199	CLASSROOMS	268,821	
200	LIFE SCIENCES		981,289
210	BIOLOGICAL SCIENCES	189,736	
220	AGRICULTURAL SCIENCES	88,718	
230	HEALTH SCIENCES	702,835	
231	MEDICINE	292,163	
233	DENTISTRY	54,732	
234	NURSING	22,897	
235	PHARMACY	24,860	
236	PUBLIC HEALTH		
238	OTHER HEALTH SCIENCES		
239	GENERAL HEALTH SCIENCES	308,183	
299	GENERAL LIFE SCIENCES		
300	M. P. C. E. SCIENCES		659,894
310	MATHEMATICAL SCIENCES	23,703	
320	COMPUTER SCIENCES	418	
330	PHYSICAL SCIENCES	316,237	
340	ENGINEERING SCIENCES	306,572	
399	GENERAL M.C.P.E. SCIENCES	12,969	
400	BEHAVIORAL SCIENCES		141,808
410	PSYCHOLOGY	38,416	
420	SOCIAL SCIENCES	101,935	
499	GENERAL SOCIAL SCIENCE	1,457	
500	HUMANITIES		244,258
510	FINE ARTS	147,116	
520	LETTERS	96,692	
599	GENERAL HUMANITIES	450	

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SCHEDULE 3 -- FLOOR AREA CLASSIFIED BY SUBJECT FIELD

	SUBJECT FIELD	ASSIGNABLE SQUARE FEET
600	PROFESSIONS	203,529
610	ADMINISTRATIVE PROFESSIONS	44,551
620	EDUCATION	38,923
630	ENVIRONMENTAL DESIGN	35,213
640	HOME ECONOMICS	20,761
650	LAW	48,605
660	SOCIAL WORK	11,004
690	OTHER PROFESSIONS	4,472
699	GENERAL PROFESSIONS	
700	TECHNICAL-VOCATIONAL	
800	PHYSICAL EDUCATION AND MILITARY SCIENCES	145,088
810	PHYSICAL EDUCATION	114,444
820	MILITARY SCIENCES	30,644

TOTAL INTERIOR FLOOR AREA FOR INSTRUCTIONAL DEPARTMENTS 2,910,416

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SCHEDULE 4 -- TOTAL CAMPUS FLOOR AREA BY FUNCTION

	FUNCTION	ASSIGNABLE SQUARE FEET	
10	INSTRUCTION	1,600,568	
20	RESEARCH	901,047	
30	PUBLIC SERVICE	121,457	
40	LIBRARY	282,570	
50	GENERAL ADMINISTRATION AND INSTITUTIONAL SERVICES	775,442	
60	AUXILIARY SERVICES	1,699,108	
70	NON-INSTITUTIONAL AGENCIES	69,165	
	SUBTOTAL		5,449,357
0	UNASSIGNABLE AREA	1,723,132	
	TOTAL INTERIOR FLOOR AREA		7,172,489